

[cl001] 1. A curing light comprising:

- a housing for housing components of a curing light,
- air space within said housing,
- at least one vent located on said housing,
- a secondary heat sink located within said housing, said heat sink having a proximal and a distal side,
- a thermoelectric cooler to assist in heat dissipation located on said secondary heat sink proximal side,
- a fan located within said housing, said fan being capable of causing air to move past said thermoelectric cooler in order to improve heat dissipation,
- a plurality of light emitting semiconductor modules located on said heat sink distal side, each of said semiconductor modules including
 - a primary heat sink,
 - a semiconductor chip which emits light of a wavelength useful for curing light curable composite materials, said chip being affixed to said primary heat sink,
 - a cover serving to protect said chip,
 - a light reflective device which collects light emitted by said semiconductor modules and focuses it into a light beam,
 - a focusing lens which serves to focus said light beam from said light reflective device onto a light transport device,
 - a light transport device for transporting light to a remote location for use in curing,
- and
- a handpiece for applying light delivered by said light transport device to a material to be cured.

[cl002] 2. A curing light as recited in claim 1 wherein said light transport device is selected from the group consisting of a plastic stack, a fiber bundle and a light guide.

[cl003] 3. A curing light as recited in claim 1 wherein said semiconductor chip is selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl004] 4. A curing light as recited in claim 1 wherein said handpiece has controls for initiating and terminating emission of light from said handpiece.

[cl005] 5. A curing light as recited in claim 1 wherein said light reflective device has a light reflective interior surface and wherein said light reflective interior surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt, chrome, other metals, plating, and plastic.

[cl006] 6. A curing light as recited in claim 1 wherein light output from said handpiece is in the range of from about 800 mw/cm² to about 2000 mw/cm².

[cl007] 7. A curing light comprising:
a housing for housing components of a curing light,
a heat sink located within said housing, said heat sink having a proximal and a distal side,
a thermoelectric cooler to assist in heat dissipation located on said secondary heat sink proximal side,
a fan located within said housing, said fan being capable of causing air to move past said thermoelectric cooler in order to improve heat dissipation,
at least one semiconductor chip which can emit light of a wavelength useful for curing light curable composite materials,
said heat sink and said thermoelectric cooler serving to dissipate heat produced by said chip,
a light reflective device which collects light emitted by said chip and focuses it into a light beam,
a focusing lens which serves to focus said light beam from said light reflective device onto a light transport device,

a light transport device for transporting light to a remote location for use in curing,
and

a handpiece for applying light delivered by said light transport device to a
material to be cured.

[cl008] 8. A curing light as recited in claim 7 wherein said light transport
device is selected from the group consisting of a plastic stack, a fiber bundle and a light
guide.

[cl009] 9. A curing light as recited in claim 7 wherein said semiconductor
chip is selected from the group consisting of light emitting diode chips, laser chips, light
emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting
laser chips, edge emitting laser chips, and VCSEL chips.

[cl010] 10. A curing light as recited in claim 7 wherein said handpiece has
controls for initiating and terminating emission of light from said handpiece.

[cl011] 11. A curing light as recited in claim 7 wherein said light reflective
device has a light reflective interior surface and wherein said light reflective interior
surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt,
chrome, other metals, plating, and plastic.

[cl012] 12. A curing light comprising:
a housing for housing components of a curing light,
a heat sink located within said housing, said heat sink having a proximal and a
distal side,
at least one semiconductor chip which can emit light of a wavelength useful for
curing light curable composite materials,
said heat sink serving to dissipate heat produced by said chip,
a light reflective device which collects light emitted by said chip and focuses it
into a light beam,
a focusing device which serves to focus said light beam from said light reflective
device onto a light transport device,

a light transport device for transporting light to a remote location for use in curing,
and

a handpiece for applying light delivered by said light transport device to a
material to be cured.

[cl013] 13. A curing light as recited in claim 12 wherein said light transport
device is selected from the group consisting of a plastic stack, a fiber bundle and a light
guide.

[cl014] 14. A curing light as recited in claim 12 wherein said semiconductor
chip is selected from the group consisting of light emitting diode chips, laser chips, light
emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting
laser chips, edge emitting laser chips, and VCSEL chips.

[cl015] 15. A curing light as recited in claim 12 wherein said handpiece has
controls for initiating and terminating emission of light from said handpiece.

[cl016] 16. A curing light as recited in claim 12 wherein said light reflective
device has a light reflective interior surface and wherein said light reflective interior
surface includes a material selected from the group consisting of Al, Au, Ag, Zn, Cu, Pt,
chrome, other metals, plating, and plastic.

[cl017] 17. A curing light comprising:
a housing for housing components of a curing light,
a heat sink located within said housing, said heat sink having a proximal and a
distal side,
at least one semiconductor chip which can emit light of a wavelength useful for
curing light curable composite materials,
said heat sink serving to dissipate heat produced by said chip,
a light focusing device which serves to focus said chip onto a light transport
device,
a light transport device for transporting light to a remote location for use in curing,
and

a handpiece for applying light delivered by said light transport device to a material to be cured.

[cl018] 18. A curing light as recited in claim 17 wherein said semiconductor chip is selected from the group consisting of light emitting diode chips, laser chips, light emitting diode chip array, diode laser chips, diode laser chip arrays, surface emitting laser chips, edge emitting laser chips, and VCSEL chips.

[cl019] 19. A curing light as recited in claim 17 wherein said handpiece has controls for initiating and terminating emission of light from said handpiece.

[cl020] 20. A curing light as recited in claim 17 wherein said light transport device includes a fiber.

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